

E-Notes

Energy Efficiency Notes

De-lamping for Energy Savings

Background

Many electrical lighting systems were designed and installed at a time when the cost of energy was not a major concern. As a consequence, spaces and rooms can often have more light than is necessary. One of the most cost-effective energy retrofits is the de-lamping of spaces. De-lamping involves the removal of selected lamps to reduce energy consumption while ensuring that adequate light levels are maintained. A sketch of a space where delamping has occurred is shown in figure 1.

Figure 1. Conference Room with one-half of the fixtures de-lamped

Prior to de-lamping, the light level on the table was about 850 lux. After de-lamping one-half of the fixtures, the light level decreased to about 500 lux. (The reason that the light level did not also decrease by one-half is that there is a large window in the room.) The de-lamping was achieved by removing both lamps from every other fixture. In the conference room example shown in figure 1, the ballasts were not removed. At a later time, the ballasts could be disconnected.

Acceptable Light Levels in Spaces

There are different lighting levels recommended for different spaces. The following table from Saskatchewan Occupational Health and Safety gives their recommendations for minimum illumination levels. They are based on the British IES Code for interior lighting (1973).

As can be seen from the table, the minimum lighting levels rarely have to exceed 500 lux for most spaces. Light levels as high as 1500 lux have occasionally been measured in Saskatchewan schools.

Minimum Illumination Levels

Type of Space	Location of light level measurement	Light level (lux)	Type of Space	Location of light Measurement	Light level (lux)
Theatres and Concert Halls	Horizontal at seat	100	Libraries --reading tables	Table	300
Cinemas	Horizontal at seat	50	School teaching spaces -general	Working plane	300
Body of church	Pews	100	Dining Spaces	Table	150
Church Halls	Floor	150	Routine Office work with no unusually low contrasts	Table	500
Lecture Theatres	Desk	300	Demanding work, deep plan, drawing, or business machine offices	Table	750
Chalkboard	Vertical Plane	500	Fine work, colour discrimination, textile processing, fine machining and assembly	Table	1000
Laboratories	Bench	500	Very fine work** Hand engraving, inspection of fine machining	Table	1500
Libraries -shelves, book stacks	Vertical at floor level	150	Minute work** Inspection of very fine assemblies	Table	3000

**To be supplied by local task lighting. Background light levels should be at least 750 to 1000 lux.

Savings from de-lamping

For a typical office with lights on for about 3500 hours per year, the annual savings from de-lamping a single two lampfluorescent fixture with 40 watt lamps is \$19.60 with electricity at a price of 7 cents per kWh. If the ballast is also disconnected, the annual saving is \$22.79.

Advantages of de-lamping

1. Substantial energy savings can be realized immediately.
2. If only the lamps are removed, it is possible to re-install the lamps if the de-lamping is not acceptable to the occupants.
3. Fixture removal, painting, etc. is not required.
4. If the building is air-conditioned, less heat will be generated by the lighting, and energy will be saved by having the air conditioning running less often.
5. Minimal labor and cost is required.

Disadvantages of de-lamping

1. The fixtures that are not lit may not have an acceptable appearance.
2. The space heating bill of the facility will increase during the heating season, as less heat is generated by the lighting system. However, most buildings in Saskatchewan are heated with natural gas, which has a heat cost about 1/3 to 1/5 that of electricity. Thus the total energy bill for the facility will decrease.
3. The ballast in a de-lamped fixture still consumes a small amount of energy.